Orchard Commodity Survey – 2012

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Introduction

An Orchard Commodity Cooperative Agricultural Pest Survey was conducted for exotic insects and diseases including light brown apple moth, Asian gypsy moth, summer fruit tortrix, false codling moth and Asiatic brown rot. Because of the potential spread of spotted wing drosophila and streptomycin-resistant fire blight in NY following their discovery in NY in 2011, we also monitored for these pests. All the agricultural pests in the survey pose significant threats to NY fruit industries.

Objectives

1. Monitor and scout for the target species in apple and peach orchards throughout the growing season of 2012 and submit suspect samples for determination.
2. Write fact sheets targeted for lay audiences and publish them in a new invasive species website within nysipm.cornell.edu.
3. Present findings of the survey at winter meetings.

Methods & Results

We adjusted the USDA APHIS written protocols for NY orchard and growing season conditions and distributed them to team members. We monitored for seven insects and diseases (Table 1), five of which were exotic pests not found in the Northeastern US. Fire blight was added to our survey efforts because streptomycin resistance in the pathogen had been identified the previous fall in Wayne County, NY.

Table 1. The insects and diseases in the survey included those listed with the number of traps in each orchard site. Samples were also collected of fire blight to test for streptomycin resistance in the pathogen. Diseases were scouted weekly.

Insect or Disease	Abbr.	Scientific name	Traps/Site
Asian gypsy moth	AGM	*Lymantria dispar asiatica*	4
false codling moth	FCM	*Thaumatotibia leucotreta*	4
light brown apple moth	LBAM	*Epiphyas postvittana*	8
summer fruit tortrix moth	SFT	*Adoxophyes orana*	4
spotted wing Drosophila	SWD	*Drosophila suzukii*	4
Asiatic brown rot	ABR	*Monilia polystroma*	na[1]
streptomycin resistant fire blight	SmR Ea	*Erwinia amylovora*	na

[1]na=Not applicable

Traps were set out in April and serviced weekly until mid-September in eight orchard locations,Table 2. Debbie Breth and Jim Eve assisted with identifying the orchard sites in the Lake Ontario region. Lures were replaced at the specified intervals. We scouted for diseases at

weekly intervals during appropriate times the season. In some orchard sites there were few to no peach or apple fruit because of blossom damage from the late spring freezes and, therefore, few brown rot samples were collected for analysis.

Table 2. The eight orchard sites in the survey are listed below, including the owner, farm name, city, county, and crop monitored. Traps were serviced at weekly intervals, weather and spray schedules permitting.

Name	Farm Name	City	County	Crop
Mark Russell	Whittier Fruit Farm	Rochester	Monroe	Apples & Peaches
Mike Zingler	R. M. Zingler Jr. Farms	Kendall	Orleans	Apples & Peaches
Gary Craft	G and S Orchards	Macedon	Wayne	Apples
Gary Orbaker	Orbaker Fruit Farm	Williamson	Wayne	Apples & Peaches
Ken Trammel	Sunnyside Orchards	Phelps	Ontario	Apples
Mike Biltonen	Red Jacket Orchards	Geneva	Ontario	Apples & Peaches
Jack Pennings	Pennings Orchard	Warwick	Orange	Apples & Peaches
Chuck Mead	Meads Orchards	Tivoli	Dutchess	Apples & Peaches

Suspect specimens were brought back to the lab for pre-screening. Gypsy moth specimens were sent to John Molongoski, Otis Lab, APHIS, according to protocol. In the Lake Ontario region, approximately 685 gypsy moth specimens were collected for analysis. Suspect specimens of FCM, LBAM, and SFT were sent to Jason Dombroskie, Dept. of Entomology, Cornell University for determinations. Brown rot samples collected were analyzed by Kerik Cox, Dept. of Plant Pathology and Plant-Microbe Biology, Cornell University.

No quarantine pests, AGM, FCM, LBAM, SFT, or ABR, were uncovered by the survey. However, 147 samples are pending molecular analysis for AGM and results should be available in January 2013. We did verify additional locations in which spotted wing drosophila and streptomycin-resistant fire blight occur in NY.

Spotted wing drosophila was first detected in late June/early July in low numbers in the peach orchards. Over the course of the growing season and into the fall, this invasive insect was found everywhere we deployed traps, as well as by Cornell Cooperative Extension personnel across New York State. Populations exploded in in mid-August and subsided in late September.

Trap catches in apple cider vinegar traps hung in apple, peach, and orchard hedgerows in Orange and Dutchess Counties in the Hudson Valley region and in Ontario, Wayne, Monroe, and Orleans Counties in the Lake Ontario region are shown in Figures 1, 2, and 3. Traps were set out in early April and removed in September. First trap catch occurred in early July.

Figure 1. SWD in Apple Orchards. Low trap numbers at all sites, peaked early September. Both farms with the highest relative SWD trap captures also grew raspberries and blueberries.

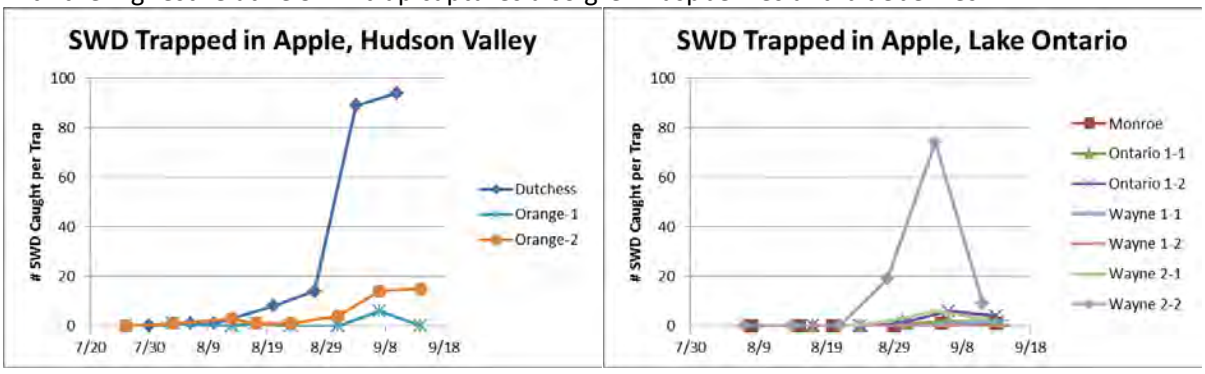


Figure 2. SWD in Peach Orchards. High SWD numbers were trapped in peach orchards and were still in increasing mid-September. High numbers of fruit flies were reared from fruit, approximately one third were SWD.

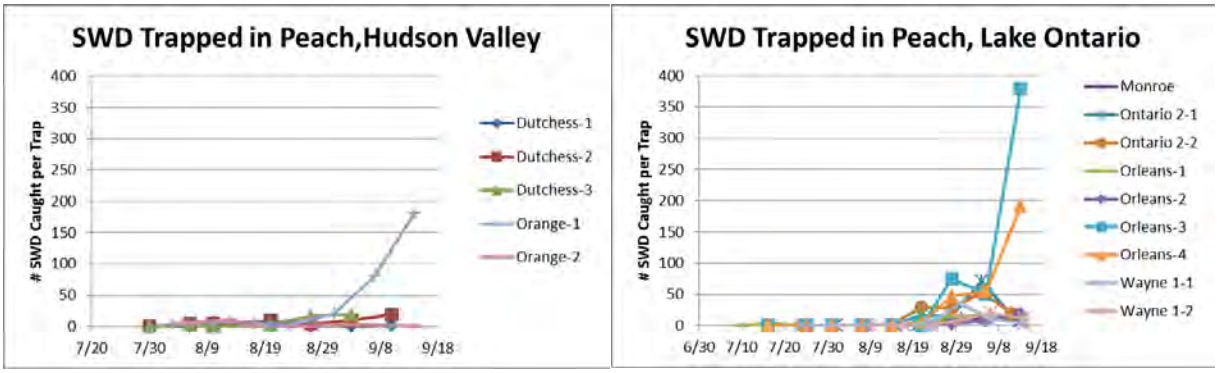
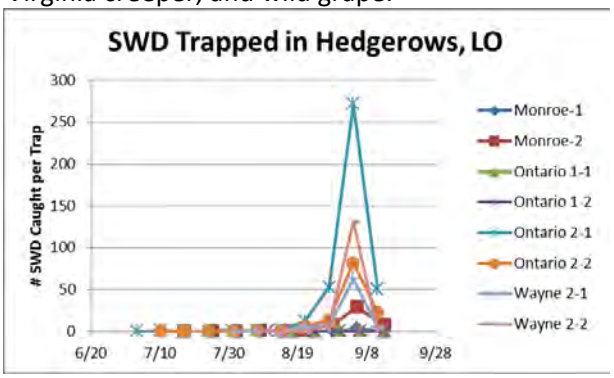
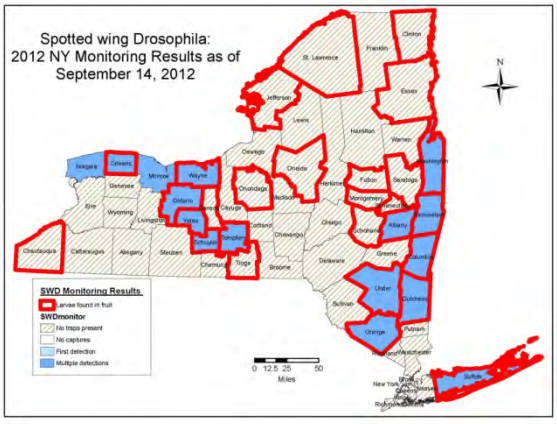


Figure 3. SWD in Hedgerows. Trap catch peaked in early September in these unsprayed areas. Plants in hedgerows included blackcap raspberry, buckthorn, pokeweed, *Prunus* spp., sumac, honeysuckle, Virginia creeper, and wild grape.



A distribution map was updated routinely and made available online by Mike Fargione at http://hudsonvf.cce.cornell.edu/NY%20SWD%20Monitoring, Figure 4. We also posted findings on the Cornell Fruit Resources fruit blog at blogs.cornell.edu/fruit/ in an effort to keep people informed of the outbreak of this introduced, invasive species. Approximately 30% of the blueberry crop and 80% of the fall raspberry crop was lost. Anecdotally, a Hudson Valley peach grower, not in the orchard survey, reported an increased incidence of brown rot in fruit until he applied an insecticide to knock down SWD.

Figure 4. Reported distribution of SWD in NY.



Streptomycin-Resistant Fire Blight was found by this survey in three new locations in NY, all in the Lake Ontario region,Table 3. Although the 2012 growing season was not very conducive to fire blight infections— the late spring freeze eliminated the blossom infection courts and the summer was dry—fire blight strikes were collected and analyzed for streptomycin-resistance in the bacterial pathogen, *Erwinia amylovora*, by Kerik Cox's lab. If resistance was identified, samples continued to be collected from other apple blocks on the same farm in an effort to gain a perspective on the spread of the resistant populations of bacteria within and among orchards. In three of the eight farms, all *E. amylovora* isolated was streptomycin-sensitive. In four of the eight farms streptomycin resistance was confirmed.

Table 3. The number of streptomycin-resistant *Erwinia amylovora* recovered from fire blight strikes collected in the eight orchards in the survey.

County	Samples[1]	No Ea[2]	Ea[3]	SmR Ea[4]
Dutchess	1	1	0	0
Monroe	1	0	1	0
Ontario	6	1	5	1
Ontario	7	3	4	2
Orleans	10	2	8	1
Ulster	8	1	7	0
Wayne	6	0	6	1
Wayne	11	2	9	0
Total	**50**	**10**	**40**	**5**

[1]Samples = Number of samples collected. Each sample consisted of a single fire blight strike.
[2]No Ea = Number of samples from which *E. amylovora* was not recovered.
[3]Ea = Number of samples from which *E. amylovora* was recovered.
[4]Smr Ea = Number of samples from which streptomycin-resistant *E. amylovora* was recovered.

Deliverables

A webpage in the NYS IPM Program website, Invasive Species & Exotic Pests nysipm.cornell.edu/invasives_exotics/ , was created to house the eight new fact sheets and their webpages that were written for the seven insects and one disease in the Orchard and Grape Commodity Surveys.

Carroll presented five talks related to and about the Orchard Commodity Survey, one covering the breadth of the survey to the New York, New England, and Canada Fruit Pest Management Workshop, Burlington, VT and four others focusing on spotted wing drosophila at the Cornell Alumni Meeting, the Spotted Wig Drosophila Working Group Meeting, the Food & Agriculture In-Service CCE Meeting, and the Cornell Viticulture & Enology CRAVE Meeting.